WILDLIFE REVIEW

AN ABSTRACTING SERVICE FOR WILDLIFE MANAGEMENT
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This issue of WILDLIFE REVIEW is devoted entirely to abstracts of papers on wildlife restoration and conservation from the

Proceedings of
the North American Wildlife Conference
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Washington, D. C. No. 6 November, 1936

FOREWORD

The Proceedings has been issued in an edition of 1,000 copies as Committee Print for the Senate Special Committee on Conservation of Wildlife Resources (74th Congress, 2d Session, xii+675 pp., September 1936). It is understood that this printing is exhausted but a larger and illustrated edition now in press is to be distributed by the U. S. Biological Survey.

The printed report contains a copy of the program of the meeting which is in effect a table of contents, records the remarks in full of most speakers and part of the discussion, and includes an index to titles and authors. The following tabulation shows the sections in which papers bearing on wildlife management are given, the inclusive pages of the sections, and the number, respectively, of addresses and special papers on the program, of those actually printed, and of those here abstracted.

Papers from the 1936 North American Wildlife Conference bearing on Wildlife Management

Sections	Inclusive pages	Number of addresses and special papers on program	Number printed	Number here abstracted
General Sessions (4-1/2 days) . .	1-274	42	83	27
Special Sessions (1/2 day each)				
Farmer-sportsman Cooperatives	275-296	6	6	5
Fish Management.	297-342	11	11	0*
Upland Wildlife Research . .	343-370	7	5	5
Game Breeding.	371-395	7	6	5
Forests and Forest Wildlife.	396-427	8	7	7
Stream and Lake Improvement.	427-468	9	9	0*
Wildlife Disease and Population Cycles Research . .	469-493	8	7	7
Research in Waterfowl Problems	494-530	10	9	9
Pollution.	531-575	8	9	1*
Practical Wildlife Management	576-618	9	7	6
Fur Resources Management . .	619-638	1	7	6
The Problem of Vanishing Species.	639-666	9	8	5
TOTALS		135	174	83

While fish management is regarded as a phase of wildlife management, papers on that subject (sections starred) are not abstracted in WILDLIFE REVIEW, a product of the Biological Survey, Department of Agriculture, because all fisheries work in the Government Service is assigned to the Bureau of Fisheries, Department of Commerce. Of the programs of the sections on Fish Management, Stream and Lake Improvement, and Pollution, only one paper is herewith abstracted, namely, that of F. C. Lincoln, entitled "The Effect of Oil Pollution on Waterfowl."

Conservation: Agencies and functions

Barker, Elliott S. [Restoration; management by public agencies], pp. 175-181.

Defines spheres of State and Federal jurisdiction; suggests a satisfactory organization of a State conservation department; problems and performance illustrated from New Mexico experience; necessity of inventories of wildlife and its environment. "Restoration and maintenance of habitat is the all-important feature in game management." Results of restocking and management in New Mexico; coordination of grazing and wildlife interests; cooperation with landowners. Conservation agencies and their functions defined from a "State's-rights" point of view.

Conservation: Agencies and functions

Bennitt, Rudolf. [Restoration; management by public agencies], pp. 190-195.

"Management of wildlife range presents a set of social, economic, and scientific problems much more complex than those involved in the conservation of any of our other natural resources." Favors general public participation in the expense of wildlife restoration. Wildlife management is a form of land use and should receive attention of all State agencies concerned with land use which should work cooperatively on all important projects.

Conservation: Agencies and functions

Biddle, Nicholas. [Restoration; management by public agencies], pp. 181-185.

History of State wildlife conservation in Pennsylvania; the refuge system and its effects; results, to date, obtained largely on forested land need to be paralleled in farming districts; this problem difficult due to non-cooperative attitude on the part of both farmers and sportsmen.

Conservation: Agencies and functions

Clark, Arthur L. [Restoration; management by public agencies], pp. 185-186.

Wildlife management can be carried out only by owners of the land. The function of public agencies is primarily research, demonstration, and education, together with framing laws and policies making private programs possible, and coordinating such activities.

Conservation: Agencies and functions

Cook, Newell B. [Restoration; management by public agencies], pp. 187-190.

Deer in Utah increased from 12,700 in 1919 to 84,000 in 1935; 65 percent of the hunters are successful. Elk, extirpated, were reintroduced in 1912 and subsequently. From 193 head a herd of about 3,500 has developed. Comment on ownership of land in Utah in relation to wildlife management. Game and range experts make studies and reports as a basis for action by a State game board. "Our game herd has been produced in Utah with dual use of all lands. There is not one foot of land x x x that has been set aside solely for game." "Cooperation is the keynote of our success in Utah x x x in no instance have we had to submit to their [Forest Service's] intention to enforce game removals." Taylor Grazing Act set-up "condemned by the large majority of the population of Utah."

Conservation: Agencies and functions

Hawes, Harry B. [The four vital factors of wildlife conservation], pp. 164-174.

Extemporaneous speech and printed version analyzing the functions and opportunities of the Federal government, the State governments, the farmer, and the sportsman in wildlife restoration and conservation.

Conservation: Antelope

Taylor, Walter P. The prong-horned antelope in the Southwest, pp. 652-655.

Antelope have shown gratifying response to protective measures, but for security adequate winter range must be assured, on a condemnation basis if necessary. The need of refuges is emphasized and suitable areas are suggested.

Conservation: By non-sportsmen

Baker, John H. [Contributions of non-sportsmen to wildlife conservation], pp. 152-155.

Refuges maintained by the National Association of Audubon Societies and the species they protect. Opportunities created by man bring on predator trouble and control therefore should be minimized. Modern research indicates that the traditional view of "vermin" is largely unwarranted. The opinion is expressed that much of the Federal control of predatory animals and rodents "is not only unnecessary but unwise," and the hope expressed that it will be reduced. The hunting license confers a privilege, not a right, and "action consistent with that viewpoint, would greatly minimize friction

between landowners x x x and license-holders." Appropriations from general funds preferable to license fees as a source of conservation support. Importance of conservation education for the youth and the work of the Association in that respect. "The Audubon Association stands for the preservation of an adequate breeding stock of all forms of native wildlife."

Conservation: Grazing interests

Anon. A statement by the National Wool Growers Association with relation to the wildlife question, pp. 222-224.

Importance of grazing industry in western economics; suggestion that the interests of grazing and wildlife be surveyed by an impartial authority.

Conservation: Grizzly bear

Baggley, George F. Status and distribution of the grizzly bear (Ursus horribilis) in the United States, pp. 646-650.

Early history of this bear indicates that it was rather numerous. Like other "big game" of the West it greatly declined in numbers. Authentic figures for the grizzly bear population are all in the period since the decline; they show an increase in numbers of the animals in National Parks and a decrease elsewhere. Net increase from 1924 to 1934, 53 individuals; total in 1934, 1,013 grizzlies. Additional refuge territory probably is needed to assure survival of the species.

Conservation: Interior Department policies

Ickes, Harold L. [The Department of the Interior and conservation], pp. 128-133.

Policies of the National Park Service and Reclamation Service with respect to wildlife. "Of course, we have to have reclamation projects, but I don't see why we can't have a reclamation project which will serve an area properly and at the same time take into consideration the needs of wildlife, making adequate provision for its protection, preservation, and continuation." The national parks system constitutes a real sanctuary for the game, the birds, and the fish of America. "I don't want to see our national parks become Coney Islands." "I wish that we could see a fighting, aggressive conservation movement."

Conservation: International

Phillips, John C. [The work of the American committee for International wildlife protection], pp. 51-56.

Account of the American Committee, and other interested organizations, and of some of their activities and accomplishments. Some immediately pressing problems are the protection of all rhinoceroses, the mountain zebra of South Africa [since given a refuge], certain species of deer, whales, and among fur animals, the chinchilla, certain seals, and the sea otters. The

Tariff Act of 1930 contains a provision for confiscation of products of animals and birds taken in violation of the laws of the countries of their origin. This was strengthened in 1935 and combined with the Lacey Act having a similar relation to interstate commerce in the United States. This legislation has a very important bearing on international wildlife protection.

Conservation: Mexican plans

Zinser, Juan. [The Mexican program], p. 254.

Plans of the Mexican Government as to creation of national parks, game preserves, and zones of refuge for migratory birds. Provisions of treaty affecting non-residents. Intention to regulate pollution.

Conservation: Migratory birds in Canada

Lloyd, Hoyes. [The administration of the wildlife of Canada], pp. 11-15.

Administrative arrangements; history and effect of the Migratory Birds Treaty; law enforcement; sanctuary history, 63 established; the national parks as wildlife refuges; advisory board on wildlife protection, composed, be it noted, entirely of Dominion and Provincial officials concerned with enforcement of the law.

Conservation: National program

Gabrielson, Ira N. [A national program for wildlife restoration], pp. 209-217.

There have been successful national programs in connection with other subjects of general interest and there should be one for wildlife restoration. The Federal Government as a landholder and manager; comparison of the areas devoted to national forests, national parks, and to wildlife reservations. Necessity of cooperation between Federal and State Governments, of closer coordination of activities by Federal agencies, of recognition of wildlife and its interests by land planning agencies, and of interesting private landholders. Wise use of the public domain should include maintenance of wildlife resources. Need for solution of the pollution problem and for adequate research; a categorical statement of the speaker's program was reproduced in WILDLIFE REVIEW, 3, April 1936, pp. 34-35.

Conservation: Taylor Grazing Act

Carpenter, F. R. [Restoration; management by public agencies], pp. 218-221.

Acreage and distribution of lands coming under scope of the Taylor Grazing Act; division into 34 tracts, each about the size of the State of Connecticut. Prior to their establishment, some ten million acres of public

domain were set aside for the primary, but not exclusive, use of wildlife. Suggestion as to a type of State committee that is permitted to name advisers on the governing boards of the grazing districts and thus assist in a program of wildlife protection.

Conservation: Trumpeter swan

Thompson, Ben H. The problem of vanishing species - the trumpeter swan, pp. 639-641.

Status of this species in Yellowstone National Park, Wyo., and at Red Rock Lakes, Wyo., the former area an inviolate refuge and the latter recently acquired by the Federal Government closed to hunting except for a single restricted area. The arrangement seems to work out satisfactorily and it appears that there has been a slow but definite increase in the numbers of this species.

Conservation: Waterfowl

Lloyd, Hoyes. Waterfowl conditions in Canada, 1935, pp. 516-518.

"Generally speaking, waterfowl breeding conditions throughout Canada in 1935 were better than they were during the previous 6 years." Summaries given for the Provinces. The hunting of wild geese which migrate across settled portions of Canada is mostly a thing of the past. The waterfowl breeding area in the southern prairie section of the Canadian west probably never again will regain its importance. Certain other areas remain suitable but their functioning depends on preservation of the breeding stock. "Good breeding conditions on the Canadian breeding grounds will not provide a waterfowl supply for the continent."

Cycles

DeLury, Ralph E., and John L. O'Connor. Regional types of response of wildlife to the sunspot cycle, pp. 490-491.

There are regional differences in response to the sunspot cycle that should be taken into consideration in connection with plans for conservation.

Destruction: Bighorn sheep

Dixon, Joseph S. The status of the Sierra bighorn sheep, pp. 641-643.

Species nearing extermination in the great majority of cases have been reduced to that plight by man - a rule to which the Sierra bighorn is no exception. Hunting (all now illegal), sheep-grazing, and other use of the bighorn's range by man are the cause of the decline. Only a few small bands totalling probably not more than 16 animals are known to remain. It may be possible to save them but it will take strenuous effort. The Forest Service is cooperating by excluding domestic sheep from the known range of the bighorn.

Destruction: Caribou

Swanson, Gustav. The Minnesota caribou herd, pp. 416-419.

These woodland caribou in Red Lake Game Refuge, the only herd in the United States, probably do not number more than 8 individuals. Depredations by poachers and wolves render unfavorable the prospect for preserving the animals.

Destruction: Pollution

Lincoln, Frederick C. The effect of oil pollution on waterfowl, pp. 555-559.

A bird once oiled is doomed. Instances of destruction of wild fowl and other birds in various parts of the country. Efforts to control dumping of oil from vessels in international trade. Nearly half of the shipping of the world is moved through the use of oil. Need of additional legislation to control oil pollution of interior waters.

Destruction: Wildlife

Silcox, F. A. [Opening address], pp. 1-5.

Of most value from the wildlife point of view in calling attention to the abundance of game in pioneer times and to the great reduction in stocks that has been caused by slaughter and usurpation of environment.

Disease: Deer lungworm

O'Roke, Earl C. The lungworm situation in the white-tailed deer (Odocoileus virginianus borealis) in Michigan, pp. 473-478.

Kinds of lungworms found, seasonal occurrence, life history, pathogenicity. Suggestions for control include, prevention of over-populations of deer, proper distribution of watering facilities in summer, and provision of sufficient food in winter.

Disease: Duck gizzard worm

Swales, W. E. Tetrameres crami Swales, 1933, an important parasite of ducks in North America, pp. 491-493.

This nematode, identified from several species of wild ducks, infests the proventriculus and causes, besides pathogenic changes there, disturbances in protein digestion. The alternate hosts are amphipods.

Disease: Eelgrass

Lewis, Harrison F., and Clarence Cottam. Eelgrass and other waterfowl foods - present status and future prospects, pp. 498-501.

Despite the annual appearance of fresh growth of eelgrass, most of this succumbs to the malady that has prevailed for several years. There has been no permanent amelioration in the condition of the plant on the Canadian coast but in the Chesapeake Bay region genuine improvement is manifest. Wigeongrass is in part replacing eelgrass and restoring ecological associations formerly dependent on the Zostera. Experiments are being made in the transplanting of resistant and introduced strains. Brant, the birds most seriously affected by decline of the eelgrass, show little if any recovery in numbers.

Disease: Lead poisoning

Green, R. G., and R. L. Dowdell. The prevention of lead poisoning in waterfowl by the use of disintegrable lead shot, pp. 486-490.

Combination of a small amount of magnesium with lead produces an alloy which will disintegrate in the presence of water, and is therefore eliminated rather promptly from the alimentary canal of ducks. Discussion of the practicability of commercial manufacture of shot having the desired characteristics.

Disease: Quail

Morley, L. C., and P. W. Wetmore. Discovery of the organism of ulcerative enteritis, pp. 471-473.

History of investigations of "quail disease", and of the authors' work resulting in identification of the causal organism as a bacterium (Corynebacterium perdicium n. sp.), criteria for the recognition of which are given.

Disease: Sanitation

Costigan, S. M. Sanitation on the game farm, pp. 380-384.

Game birds for restocking are not only of lessened value if diseased or parasitized but are a menace to the wild population. They should be raised and released as nearly disease-free as possible. Classification of diseases according to their causative agents and of remedial measures with respect to their effectiveness against these agents. Sodium hypochlorite the most satisfactory disinfectant for pens and for water. Yards, not being readily disinfected, should be rotated. Remarks on disease preventive measures.

Disease: Snowshoe hare, etc.

Green, R. G., and J. E. Shillinger. Progress report of wildlife disease studies for 1935, pp. 469-471.

The peak population of the snowshoe hare in the Lake Alexander area, Minn., was reached in 1933. Spring censuses gave 478 hares to the square mile in that year, 374 in 1934, and 220 in 1935. Tularemia is not a major factor in the die-off of the snowshoe hare. Figures are given on tick infestation and on the extent to which ticks harbored tularemia. Fowl cholera and a filterable virus disease identified in ruffed grouse. Notes on disease among captive red foxes, pheasants, and Canada geese, and among wild gray foxes, raccoons, and rabbits.

Ecology: Carrying capacity for duck nests

Bennett, Logan J. Duck nesting carrying capacities in Iowa, pp. 494-498, 1 table.

The heaviest concentration of nests found was one to an acre (21 on an equal number of acres) where the cover was chiefly cord grass. Ninety-five percent of the nests of shoal-water ducks were found within 220 yards of the shoreline. A relationship between length of shoreline and usable nesting cover therefore is evident. From studies in Alberta as well as in Iowa, it was found that areas surrounding potholes of about half an acre in extent presented optimum nesting conditions. Bibliography of 8 titles.

Ecology: Duck counting

Lincoln, Frederick C. Waterfowl populations, pp. 509-516.

On account of the migratory habits of the birds, adequate studies of the waterfowl population can be made only on a continental basis. Censuses or accurate counts are impossible but estimates having practical value can be made. Description of methods used in a survey that indicated there were about 17,000,000 wild ducks in the United States in January 1935. Correlated work showed about 10,000,000 present in Mexico and Central America. Estimating 6 million legally killed, 6 million illegally bagged or destroyed by other causes in the United States, and 5 million lost due to like causes in Canada and Mexico, an estimate of 44,000,000 game waterfowl prior to the shooting season is reached. The estimated loss of 17,000,000 or 40 percent is considered too much of a drain upon the stock and regulations should be framed to reduce it. Description of breeding season surveys including those of 5 field parties in Canada, with some notes on the results. The method of counting flocks of waterfowl on the water is to estimate the square yards covered by the flock, allow one bird for each square yard, and subtract one-third to compensate for open spaces and irregular configuration of the raft.

Ecology: Mosquito control operations

Bourn, W. S. Mosquito control and waterfowl, pp. 505-508.

Control of mosquitos to assure human comfort and health is approved but drainage projects apparently not in the public interest are opposed. Studies, both direct and experimental, of the ecological effect of drainage are under way. Location and character of the investigational work and extent of cooperation are stated.

Ecology: Overpopulation of moose

Hickie, Paul F. Isle Royale moose studies, pp. 396-398.

Moose, first reported about 1914, steadily increased in numbers until it was evident that in the absence of predators or other checks there would be an overpopulation. Shortage of food ensued, was aggravated by devastation of balsam fir by the spruce budworm, and the herd has been rapidly declining from about 1933. Field studies and autopsies in 1934 showed clearly that malnutrition was the cause of the decimation of the herd. Some of the animals were removed for stocking elsewhere and more will be. Experiments with captive moose showed a daily requirement of about 25 pounds of mixed balsam and birch browse.

Economic Values

Rosengren, Roswell P. [Why concern ourselves about wildlife? Economic importance discussed], pp. 29-35.

Emphasis on economic values; statement of the evils of deforestation, drainage, pollution, overgrazing, and persecution of wildlife. "The power, importance, and wealth of the United States has been built on a ruthless robbing of nature's bounty." Necessity of conservation and wise use to the prosperity of the country.

Education

Smith, C. B. [Extension Service and 4-H clubs in relation to conservation], pp. 139-142.

Sketch of the work done, with concrete examples, especially for Minnesota and Nebraska. "We look upon the work by rural youth in the various phases of x x x [nature] as contributing about as much to the abundant life as any one thing we can do in extension."

Education

Studebaker, John W. [Conservation in the schools], pp. 134-139.

A plan for promoting the teaching of conservation in the schools of the nation.

Farmer-sportsman relationship

Bennett, Logan J. Iowa, pp. 290-293.

Dry lake beds leased to sportsmen's organizations for nominal fees and with game management plans furnished by the State showed several hundred percent increase in pheasants the first year. [Perhaps largely inflow.] After 16 years of closed seasons on quail, shooting was resumed only with the cooperation of groups favorable to complete protection. Shooting had to be closely regulated, therefore, and this required considerable effort and expense. Trial of game management was made on 130 areas varying from 640 to 17,000 acres in size. Defects in operation are pointed out and a revised plan is set forth.

Farmer-sportsman relationship

Chalk, John D. North Carolina, pp. 288-290.

Plans.

Farmer-sportsman relationship

Leopold, Aldo. North Central Region, pp. 279—285.

Of 350 farmer-sportsman areas developed in the region since 1931, most apparently survive at least on paper. "There are six types of organization x x x and three choices of legal status, hence 18 types of set-up are possible." A few of these are discussed. Of the strictly commercial type - leased shooting - the farmer doing nothing, and management, if any, being done by the lessor or agent; about 65 have sprung up in Wisconsin of which 59 survive. From the standpoint of public policy they seem more objectionable than otherwise, and after experience, similar arrangements were denied legal authorization in Michigan. An example is given of a small-scale farmer-sportsman cooperative, the farmer contributing land and feed, the sportsman cash, and both parties sharing very moderate shooting. Extension of this type seems desirable. Notes on Iowa farmer pools, but on this topic see Bennett. "Whether Iowa succeeds or fails, it takes courage to attack this difficult problem of how to make the transition from the old system, which is bankrupt, to some new system x x x as yet only dimly defined." Two of three farmer-sportsman associations failed because of quarrelling; the other, restricted to simple management of cottontails, has been an astonishing success. Farmer pools on a fee basis have failed but new plans are being tried. No standardized scheme seems likely to succeed when so much depends on the personality and interests of the landholder. Absentee management is poor at best. Comment on the difficulties of teaching cooperative game management and of administering schemes for promoting it. Bibliography of 6 titles. A tabulation shows classes and legal status of organizations for farmer-sportsman cooperation in the North Central States.

Farmer-sportsman relationship

MacNamara, L. G. New Jersey, pp. 275-278.

Under the plan fostered by the State Fish and Game Commission, one-fifth of a cooperating farmer's land is posted and maintained as a refuge by the Commission. [As this land is immediately adjacent to the farm buildings and pastures, it is evidently a refuge for the farmer, his family, and his stock, rather than for wildlife.] The remainder of the farm is open to hunting, but the farmer may restrict the number of hunters to one to each 20 acres; the hunters must register. The area is stocked by the Commission, advice given on game management, and seed furnished for feed patches. In three years (1933-5) the acreage of lands under contract increased from 52,500 to 127,759. Sportsmen's clubs, to which farmers may belong, with Commission cooperation also, make less restricted arrangements with farmers. On these lands a thorough winter feeding program has been carried out. The State further has public shooting grounds which serve as game management demonstration areas.

Farmer-sportsman relationship

O'Connell, Frank B. Nebraska, pp. 286-288.

Steady decrease in game birds demands consideration of plans formerly held too commercial. The Nebraska "Hunters Shooting Scrip Act" did not work possibly because of being tried at a time when farmers were not anxious to increase their revenue. A new and more thorough trial planned. Everything possible should be done to build up a friendly relation between the sportsman and the farmer. Contribution by sportsmen of grains for winter feeding of wildlife is a successful means to this end.

Farmer-sportsman relationship

Ruhl, H. D. Coordination of farm-game management with the usual farm-game practices, pp. 603-606. Printed also in American Wildlife (American Wildlife Institute, Investment Bldg., Washington, D. C., 25 cents a copy), 25(3), May-June 1936, pp. 35, 42-44, 6 photos.

Game management on farms must fit in with agricultural practice and contribute to making farming more profitable. The techniques must be developed by interests definitely friendly to the farmer, and tested at a new type of wildlife experiment station. While certain practices bad from the farming standpoint have actually been put into effect, others have been tried that are beneficial both to the farm and to wildlife. It is such methods that must be worked out by experiment and test so that the results of adopting them will be fairly predictable. Suppose successful methods are developed and applied, will the market and the price hold up? What about the competition of free hunting? An original and thoughtful treatment of the vexed farmer-sportsman relationship. Bibliography of 3 titles.

Farmer-sportsman relationship

Schoenfeld, Wm. A. Wildlife as an agricultural resource, pp. 608-613.

Wildlife management and agriculture are by nature inseparable, and the problem is to conduct the two in harmony and to their mutual benefit. Wildlife management should be approached in the same spirit and by similar methods as are other phases of agriculture. "In making effective any program for adding wildlife production to our other agricultural enterprises, several definite steps," said the speaker, "it seems to me, are essential. First, there must be created favorable public sentiment, both among farmers themselves and on the part of the general public. To do this will require considerable change in the thinking regarding many formerly accepted practices, both by farmers and sportsmen. Another step will be the training of a sufficient group of men who can be used throughout the country in giving specialized guidance to rural and urban people in their handling of the wildlife problems. The third step, which must be taken coordinately with the other two, is the carrying on of a strong research program to add to the present knowledge of wildlife management. This will include, among other elements, study of the food habits, methods of propagation and distribution of wildlife, and methods of disease prevention and control."

In the West, the interests of livestock and big game must be coordinated and experience proves it can be done. So far as farm game is concerned the way must be prepared by research, demonstration, and other educational methods. The need of additional farm income is pressing and wildlife management should help to solve that problem. Oregon is trying a scrip plan under which the farmer receives 45 (and the State game commission five) cents for each pheasant bagged. The establishment of a Cooperative Wildlife Management and Demonstration Project at Oregon State College has revealed a demand far greater than was anticipated for training in wildlife management. Suggestion of subjects for research.

Farmer-sportsman relationship

Taber, L. J. [The National Grange and game restoration], pp. 160-163.

Stresses the necessity of financial rewards to farmers who, as a class, believe in conservation but who may find economic pressure so keen that it is impossible for them to do what they should like to do. The farmer feeds game every day in the year and if we hope to make any progress, we must recognize his rights. Extending fair treatment, we can depend upon the farmer as the bulwark of the program of wildlife restoration and conservation.

Food Habits: Deer dietary requirements

Nichol, A. A. The experimental feeding of deer, pp. 403-410.

Forage requirements for livestock are quite definitely known from experimental studies; to aid good management, similar information should be made available relative to wildlife. The species used in the study were the Rocky Mountain mule deer and the Arizona whitetail. Equipment and routine of the experiment described. To obtain a basic subsistence ration, studies were made with alfalfa hay for roughage, and oats, corn, and barley for concentrate. The maintenance ration was found to be 2.2 lbs. to each hundred pounds of the deer's weight; 2.3 lbs. were given to does during pregnancy. Experiments with mixed native foods showed that about the same quantities were sufficient. The results as to palatability differ from some that have been published on the basis of field studies. Grasses were found of more importance than is usually recognized. Some of the more palatable foods are live oak, mulberry, hackberry, aspen, wild buckwheat (Eriogonum), Fendlera, mountain mahogany, mistletoe, wild grape, and legumes. Various miscellaneous findings from the experiment also are reported.

Food Habits: Nutritive values of winter foods

Errington, Paul L. Differences in nutritive values of winter game foods, pp. 356-360.

Even if natural preferences of wildlife may be a good guide to food selection, under critical conditions there may not be opportunity to get the most desirable types of food. Winter may be a period of food crisis and an important part of management may consist in assuring an adequate food supply. Corn appears to be a highly satisfactory winter food for quail and pheasants. Others of considerable value include soybeans, sorghum, most cultivated grains, acorns, akenes of ragweed, seeds of pigeon grass, beggarweed, hog peanut, and jewelweed. Under experimental conditions, seeds of sweetclover and butterprint have a mildly toxic effect, and fruits such as those of sumac, wild grape, rose, and coralberry did not suffice to prevent loss in weight of the captive birds. In few localities in the North-central States are there more than 2 or 3 kinds of staple winter foods in quantity sufficient to supply the needs of moderate populations of pheasants and quail, and emphasis should be placed on keeping the environment well supplied with foods of substantial nutritive value rather than of the succulent or "salad" types. Bibliography of 6 titles.

Game: Of Mexico

Zinser, Juan. [The Mexican wildlife situation], pp. 6-11.

Comment on the principal game species, both mammals and birds, giving scientific, Mexican, and American names, and indicating the extent to which they are hunted, their numerical status, and existing and proposed protective measures.

Life Histories: Bobwhite population fluctuations

Kennedy, I. N. Fluctuations in the population of bobwhite quail in the South, pp. 481-486.

Largely due to meteorological conditions. The same paper abstracted from another source in WILDLIFE REVIEW, 4, June 1936, p. 9. It has also been published in Maryland Conservationist (512 Munsey Bldg., Baltimore, Md.), 13(3), Summer Issue 1936, pp. 1-3.

Life Histories: Cottontail rabbit reproduction

Trippensee, R. E. The reproductive function in the cottontail rabbit (Sylvilagus floridanus mearnsii Allen) in southern Michigan, pp. 344-350, 2 tables.

The importance of the cottontail as a game species emphasizes the need for thorough information as to its life history. Description of primary and secondary sexual characters. Data on sex ratio conflicting but the numbers of the sexes seem to be about equal. Sexual maturity of females attained about the fortieth week, so breeding does not occur the first season. In southern Michigan two litters per year are common and even four are possible. The number of young per litter averages 5.04. Parturition nests and their location described. The young are born blind and helpless but grow rapidly and at 2 weeks of age eat grass and move out from the nest for limited distances. The young are well cared for and defended. The breeding season extends from January to August. Bibliography of 10 titles.

Management: Burning

Stoddard, H. L. Relation of burning to timber and wildlife, pp. 399-403.

Light surface fires may be used, under proper supervision, with benefit both to the forest and wildlife. In fact properly used fire may be considered the most important tool of the game manager in the Southeast. Under a policy of fire exclusion, legumes of primary food value to quail, wild turkey, and other wildlife are gradually suppressed, cover becomes undesirably dense, and parasites multiply. Fire prepares the way for a good catch of pine seedlings; these should then be protected from fire for at least a year; after that light burning at intervals of from 1 to 3 years is beneficial. Fire should be excluded from swampy low woods and from the upland "hammock" type. February and March are the best season for burning operations. Technique of light burning described.

Management: Duck breeding grounds

Huntington, John C. The wild-duck factory needs repairs, pp. 518-523, 1 pl.

Seventy percent of the prairie type of breeding territory lies in Canada. The remainder in the United States has virtually lost its importance and, despite development of refuges, there is doubt that it will ever again supply a sizable percentage of the continental duck crop. "It is the breeding grounds of Canada that hold the key to the future of ducks." Good management of the northern section of the Canadian breeding area and restoration and management of parts of the southern area, not particularly valuable for agriculture, are urged. Suggestions are given as to lines of improvement, cost, and who should bear the cost. "It is squarely up to the duck shooters of the United States x x x to take the initiative and to decide promptly whether or not this necessary job should be thoroughly done, now before it is too late."

Management: Environmental improvement

Bump, Gardiner. From scrub oak and pitch pine to quail, pp. 599-603, 1 table.

3,700 acres of the Camp Upton area on Long Island were devoted to experimental wildlife management; 49.6 miles of food strips and 19.8 miles of a combination feed strip and fire line were cleared and planted. Reforestation was undertaken but islands of native cover were preserved. Watering facilities were doubled and a moderate degree of predator control was exercised. Some restocking was done, but aside from that a considerable increase in the game bird population is believed to have been achieved in the single year the project has been under way.

Special experimental feed patches were installed and the characteristics of the plants in them are tabulated so as to show their value to wildlife, especially in retaining seed through the winter, and in remaining upright regardless of snowfall. On the basis of this single year's work, the following food plants are regarded as best for the region at the seasons indicated: For late spring and summer - (1) winter rye; for fall - (1) Tartary buckwheat, (2) Japanese millet, (3) proso; for winter - (1) golden millet, (2) Tartary buckwheat, (3) early amber sorghum, (4) spring rye. Some cost figures are given.

Management: Environmental improvement

Hosley, N. W. Permanent food and cover for wildlife in the Northeastern United States, pp. 576-582, 2 tables. Printed also in American Wildlife (American Wildlife Institute, Investment Bldg., Washington, D. C., 25 cents a copy), 25(3), May-June 1936, pp. 36, 44-46, 4 photos, 2 tables.

In addition to general discussion, this paper includes a valuable table showing the chemical composition of 11 kinds of wild fruit, 7 of mast species, and of corn and grasshoppers for comparison. There is presented in tabular form also a summary of records as to utilization by song birds, and

by 6 species of avian, and 5 of mammalian, game, of 44 groups of plant food producers. Variable comment on bearing season, habitat, and germination requirements of some of the plant groups. Bibliography of 10 titles.

Management: Forests for deer

Clepper, Henry E. Forest-carrying capacity and food problems of deer, pp. 410-415.

Silvicultural practices have been directed greatly toward timber, little toward game, production. Some foresters prefer a minimum deer population because deer are an obstacle to reforestation. Regulation, not elimination, of deer, however, would seem the best policy. In the Northeastern States, forests carry populations as high as one deer to each 15 to 25 acres, but at that figure they are overpopulated. In some years hundreds of deer have died of starvation in Pennsylvania. Specific information on carrying capacity is greatly needed and experiments under way are designed to supply it. Tree growth suppresses the shrubby vegetation that is of most value to deer. Selective cutting can correct this condition and its effects may persist for at least 5 or 6 years. Orderly improvement cutting will increase carrying capacity of forests and improve the condition of the deer. Such work has been started on Pennsylvania state forests.

Management: Forests for wildlife

McAtee, W. L. Forest management and wildlife management, pp. 419-423.

For maximum production of timber on the one hand, and of wildlife on the other, the requirements as to manipulation of the vegetative cover are almost entirely opposed. Recognition of this fact should clarify considerations of policy and help foresters and wildlife managers in deciding what treatment to give various areas. Stand improvement operations may be inimical to wildlife, and encouragement of the closed canopy certainly is. Burns and clearings soon become, and for some time remain, improved habitat for wildlife. Foresters are justified in practicing pure forestry in their domain but on lands where wildlife production is a primary objective, wildlife managers should forget forestry and adopt any and all policies necessary for the highest welfare of wildlife. Bibliography of 5 titles.

Management: Fur resources

Bonnycastle, R. H. G. Hudson's Bay Co. and fur conservation, pp. 625-628.

In existence since 1670, the Company really governed a large part of Canada until comparatively recent times. Controlling half of the total crop of raw furs of Canada, the Hudson's Bay Company is vitally interested in maintaining the stock. Conservation is necessary also to prevent the Indians and Eskimos from becoming public wards. The Company is interested

in fur farming and is developing it as rapidly as possible, consistent with quality of product. Beaver were the basis of much of the fur countries' prosperity and with their decline the human population suffered. As a step to restore these animals, a 7,000 square mile tract was leased from the Province of Quebec and made a beaver sanctuary, Indians being employed as guardians. The increase in the animals has been steady: 1933, total 162; 1934, 368; and 1935, 600. It is thought that this project will result in the restoration of beaver trapping and in consequence of the prosperity of the region. The success of this initial undertaking has inspired the establishment of similar refuge units in other areas.

Management: Fur resources

Cameron, T. The conservation of fur in the Northwest Territories of Canada, pp. 621-625.

Over an area of more than 1,300,000 square miles, wildlife and particularly fur animals are now, as they ever have been, the basis of livelihood for the sparse population. Mining developments have brought in many new people in recent years but this new situation has promptly been met by Dominion officials responsible for wildlife protection. Vast reserves have been set aside and hunting and trapping regulations carefully revised. Location, area, and general character of the principal refuges are set forth. The value of the fur yield of the Northwest Territories for 1933-4 was $1,515,017. A table shows the number of skins of the leading species marketed.

Management: Fur resources

Genfan, Irving M. [Platform of the American Trappers' Association], pp. 632-637.

The trapper-farmer is the foundation of the American fur industry. The platform is as follows; some of the sections are commented upon in the full text of the address.

"1. Protect and propagate beneficial wildlife.
"2. Eliminate unnecessary cruelty in trapping.
"3. Strenuous opposition to the use of poison baits to kill fur-bearers.
"4. Protect beneficial wildlife from unfair methods - smoking, den digging, tree cutting, and so forth.
"5. Restock as much as possible all lands where desirable species are extinct; introduce new species where needed.
"6. Demand laws in compliance with necessity - protective to wildlife and of benefit to the fur industry in general.
"7. Protect trappers from dishonest fur houses and educate trappers to the proper methods of handling furs to enhance their value.
"8. Protect the American market from imported furs, the same as other industry; educate the American public to the superiority of American furs; insist upon all furs being sold under true name.

"9. Protect our forests from fires or other forms of destruction; encourage reforestation; protect our streams from undue pollution or commercialization; discourage drainage or reclamation of such lands as will be of more value as a refuge of fur and game.

"10. Eternal vigilance and protection of the trapping and fur industry from any organization, or combination of organizations, whose purpose is based upon fanaticism or greed, or whose ideals are not in keeping with the rules of true sportsmanship, or, whose intentions are detrimental to the interests of the trapping and fur industry."

Management: Fur resources

King, C. E. [Fur situation in Louisiana], pp. 630-632.

The fur catch in Louisiana has greatly declined; formerly employing 25,000 trappers it now gives occupation to only 5,000. Research is required to develop a basis for recovery.

Management: Fur resources

Lloyd, Hoyes. Canada's fur resources, pp. 628-630.

Relation of the fur trade to the development of Canada. The benefits of good management proved by history of the Pribilof fur seal herd. Growth of fur farming; it is estimated that a third of the total value of Canadian furs is derived from animals bred on farms. The value of Dominion furs in 1933-4 was $12,349,328; the principal items are annotated.

Management: Fur resources

Mills, David C, Acting Chairman. [An American fur policy], pp. 637-638.

The first ten articles in the policy as amended and adopted by the sectional conference are:

"1. That the economic and social value of fur animals as a natural resource be more generally and specifically recognized by State and Federal Governments and that it should receive financial support for development from State and Federal Governments commensurate with its importance.

"2. Inasmuch as basic statistical data essential to intelligent fur-resource management is and has been heretofore impossible of attainment, we recommend that the State and Federal Governments shall cooperate in a survey of the latent as well as visible supply of fur animals and we also suggest as the first step toward this end:

(1) The States shall inaugurate a reliable system of recording the annual catch of fur animals.

(2) All fur shipments in interstate trade shall be reported as to number and kind by the shipper to the Federal Government and checked by a similar report to the Federal Government by the receiver.

"3. It is recommended to the States that their trapping laws be amended to segregate trapping from hunting and fishing by the issuance of trapping licenses to adult trappers at a reasonable fee and trapping permits to youths without charge, the object being to obtain statistical data on the annual catch of fur animals and to make it possible for the States to disseminate information to make trapping more profitable.

"4. It is our conviction that the Federal Government has too long neglected and ignored the economic value of fur resources in the administration of public lands and we, therefore, urge that surveys be made by appropriate governmental agencies of areas in the public domain adaptable as, or affording, suitable habitats for fur animals, and, further, that such areas insofar as practicable be devoted to developing and maintaining this natural resource.

"5. That in particular no reclamation, irrigation, or drainage projects shall be undertaken without the approval of the Biological Survey after this organization has determined the effect of such projects upon the natural supply of fur animals on the land under consideration.

"6. Regardless of the laws in respect of the title to wildlife throughout the public domain it is our opinion that the physical act of trapping on the public domain is and should be within the judgment of the Federal Government as it is of private land owners, and that the control of trapping on the public domain is within the jurisdiction of the Federal Government.

"7. While approving of the reduction of the use of poison by the Government in predatory-animal control, we believe that this reduction has not gone far enough and that other methods less questionable from the standpoint of conservation should be attempted. We further recommend that predatory-animal control be strictly limited to areas in which depredations are of severe consequence.

"8. It is our belief that, generally speaking, open seasons for trapping fur animals are too long and that with due allowance for exceptions rendered necessary by local conditions an open season of not more than 2 months in the prime-fur season of any year is sufficient and all that this wildlife resource can stand. We recommend that the States be encouraged to act on this recommendation.

"9. We recommend a closed season of at least 5 years' duration throughout the entire country on fisher, wolverine, and marten. All of these are extremely valuable and are on the verge of extinction in the United States.

"10. We deprecate the criminal and short-sighted activities of dealers in illicit furs, especially beaver, and suggest an aggressive policy on the part of the Government with which the raw-fur trade at large will cheerfully cooperate."

Management: Indian Reservations

MacInnes, T. R. L. [What Canada is doing for the hunting Indians], extemporaneous remarks, pp. 229-232, formal paper, pp. 232-236.

Canadian problems similar to those in the United States (see below); Indian home reservations much smaller, but very extensive hunting areas have been set aside for their exclusive use. Formerly Indian families parcelled out hunting and trapping territories which were recognized among themselves and handed down from one generation to another. On each of these areas several trap lines were established, only one of which was trapped during a given season or series of seasons, giving in effect a system of rotation similar in principle to that used in agricultural cropping. A modern system of trapping certain areas under permit is modelled on this Indian practice.

Management: Indian Reservations

Marshall, Robert. [Wildlife management on Indian Reservations], pp. 224-228.

Indians, prior to contact with white men, were generally prudent in utilizing wildlife. The bad example of the white man, and necessity, combined to turn the Indians into exploiters. There are no legal means of restricting hunting by Indians on their reservations and the approach to better conservation must be by restoration of economic stability of the Indians who, then not driven by necessity, will doubtless seriously consider reasonable restrictions on hunting, trapping, and fishing.

Management: Land planning

Leopold, Aldo. [Restoration; management by private agencies], pp. 156-158.

Game management must be applied to all available areas to produce a supply equal to the demand. Conclusions: "1. The present program is lop-sided. The inherent properties of wildlife and land use call for moderate stands on large areas, rather than heavy stands on small areas. Management on large areas means management on private lands; 2. Some misplaced private ownerships must be extinguished to save rare species. The grizzly is an example; 3. There is need for a new mechanism to reward private conservation of small waterfowl breeding areas and other spots which the public cannot buy, which must be managed, but which should not be shot; 4. There are inherent limits of speed and size in the building of public conservation agencies."

Management: Marking ruffed grouse

King, Ralph T. [Methods of marking ruffed grouse. Part of a discussion], pp. 369-370.

Dyed feathers cemented on plumage of adults; engraved surgeon's clip on young before large enough for banding. Less than 10 percent returns on juvenile birds.

Management: National Forests

Silcox, F. A. Wildlife management on the National Forests, pp. 255-259.

"In the West as a whole, almost 75 percent of the remaining big-game ranges are now within national forests." Despite joint use with livestock summer forage is in most areas adequate. Winter range, however, is deficient, and animals which can live on the national forests for 9 to 10 months of the year are in winter forced outside. The territory they frequent at that time, some 20,000,000 acres, should be added to the national forest system. Refuges alone may prove unsatisfactory and wildlife management on a broad basis is needed. Organization of a Division of Wildlife Management in the Forest Service announced. Plans call for a wildlife specialist in each of 6 forest regions, and for one in each of 100 forests important for wildlife. A mobile force of some 200 men to supplement existing law enforcement personnel also is contemplated. Plans include cooperation with the Biological Survey in game surveys and the establishment of Biological Survey research stations. "All national-forest resources are perpetuated through use in the interests of the greatest number of people in the long run. Wildlife is one of those resources."

Management: National Parks

Wright, George M. [Restoration; management by public agencies], pp. 236-239.

Protection on the national parks alone cannot absolutely safeguard wildlife because it may be affected by conditions on adjacent areas. "Unless there can be a national program of wildlife restoration and conservation, then eventually the parks and sanctuaries will become drained of their wildlife and will become part of the growing biological desert of America." The parks regarded as laboratories preserve natural conditions the wildlife manager should know when he seeks to restore natural habitats. An important function of the parks is the perpetuation of representative examples of the principal biotic associations of the United States.

Management: Refuges

Kubichek, W. F. The C. C. C. rehabilitates waterfowl habitat, pp. 615-618.

The construction and usefulness of dams, dikes, and islands are briefly noted. Fuller information is given about the collection and storing of seeds and other parts of plants to be used in improving food and cover on the Federal migratory bird refuges. A table is given showing the number of tons of such material collected.

Management: Refuges

Selyer, J. C. Practical waterfowl management, pp. 584-598.

In 19 months, 45 new refuges totalling over one and a half million acres were established. The three principal types involved are, (1) The great nesting marsh restorations of the North and Northwest, (2) The intermediate nesting and feeding migratory refuges along the four great flyways of the continent, and (3) The large-scale wintering refuges in the southern part of the country, extending from the mouth of the Delaware to the Sacramento Valley in California. There is discussion by regions of refuge needs and how they are being met, with special comment on one or more refuges in each region illustrating sectional variations in refuge acquisition, qualifications, improvement, and management. The principles underlying the Federal migratory waterfowl refuge program are categorically stated and suggestions made as to cooperation by the States.

Management: Regulating kill

Cunningham, A. G. Wild waterfowl conditions in Manitoba, pp. 525-526.

Geese are hardly molested in the Province but each year about 135,000 ducks are killed. Drought and other drawbacks have greatly reduced wild fowl production. Hunting must be decreased and Manitoba has steadily increased its restrictions on the kill.

Management: Regulating kill

Taverner, P. A. The fundamentals of the duck situation, 1936, pp. 523-525.

Ducks have been steadily decreasing ever since the white man came to the country. There are many contributing causes but all boil down to this - that mortality has been greater than reproduction. It has been said that human restriction has been tried and failed. The truth is that adequate restriction has never been fairly tried. The only surety for the permanency of duck shooting seems to lie in the limitation of the number of guns in the field.

Management: Restocking

Wessell, Charles W. Releasing larger pheasants, pp. 384-385.

Release at 6-7 weeks not proving very satisfactory, restocking with fully grown birds in spring is planned.

Management: Ruffed grouse

Miller, J. Paul. A report on the Pillsbury, New Hampshire, game management project, pp. 360-365.

Description of the area, the lines of investigation proposed, methods of recording data by the use of few base, but many translucent, outline maps. Studies of ruffed grouse indicate limited range for individuals, loss of about 31 percent of the birds to predators in 6 months, and 50 percent of nests destroyed or abandoned. Effects of silvicultural work by foresters show little indication of benefitting wildlife. Experimental work included especially "release" of apple trees, provision of escape runs in masses of cover, and the making of openings in the forest. Feed patches without special treatment of soil were failures. Seasonal availability of wild fruits was recorded and in general found rather short. Studies of conditions in relation to aquatic plants and fur animals are in progress.

Management: Sandhill crane

Henika, Franklin S. Sandhill cranes in Wisconsin and other Lake States, pp. 644-645.

Ecological requirements of the species; notes on existing colonies in the region reported on; three of the areas have recently come under partial administrative control of the Federal Government. Preservation of suitable environment, strict protection, and management are necessary to perpetuating this magnificent species in the Lake States.

Management: Soil Conservation Service

Holt, Ernest G. Soil conservation means wildlife conservation, pp. 239-243.

Contrast of conditions before and after settlement by white men. As a result of soil exploitation a hundred million acres of good farm land have been essentially destroyed for crop use by erosion, a like area has been severely impoverished, and a third aggregate of the same order is now being rapidly eroded. Soil and wildlife go downhill together and must be brought back together. Aims of the Soil Conservation Service and of the Section of Wildlife Management. The methods are such that "the wildlife specialist could not ask a better opportunity for the application of his science." Revegetation is the keynote, and it affords a chance to renew the conditions most favorable for wildlife existence. The program is carried on through demonstrations lasting 5 years, the hope being that the farmer will become interested in continuing wildlife management and that he will be encouraged to do so by a proper attitude on the part of the public, especially the sportsmen.

Management: Stocking

Bonnycastle, R. H. G. Canada's reindeer experiment, pp. 424-427.

Account of driving a herd of reindeer from the west coast of Alaska, 1,600 miles along the Arctic rim of the continent, to a 6,000 square mile reserve near Kittigazuit, east of the Mackenzie Delta. The drive began December 1929 and was concluded March 1935. The herd contained 3,440 reindeer at the start and 2,370 at the finish. Fawning in the spring of 1935 again brought the number of the herd to more than 3,000. History of the drive and of the preliminary investigations, both of which were carried out in a very systematic and thorough way.

Management: War Department Reservations

Hobson, Wm. H. [Restoration; management by public agencies], pp. 244-250.

Lt. Col. Hobson reported that there are 375 War Department reservations totalling about one and a half million acres. On many of these game management is being practiced and the results in illustrative examples are cited. Work of the Army Engineers that affects wildlife is conducted in cooperation with the proper Federal bureaus.

Management: Waterfowl

Pirnie, M. D. Michigan waterfowl management studies, pp. 501-504, 1 table.

Returns from the banding of nearly ten thousand wild ducks indicate an annual kill of close to half of the stock. Shorter open seasons lessen the kill and increase the next years' breeding stock. There has been no shortage of wild fowl food in Michigan; muskrats appear to be more, but carp less, destructive than reported elsewhere. Thus far artificial stocking has not proved effective as a restoration measure. Notes are given on diseases, parasites, and predators. "Michigan observations fail to indicate serious losses of healthy, uncrippled waterfowl by predators, except in the case of incubating birds."

Management: Wild turkey

Stoddard, H. L. Management of wild turkey, pp. 352-356.

Desirability of preserving genuine wild stock. Restocked areas should be in part absolute sanctuaries which, at least, in the early stages of a restoration program should be of 20,000 to 100,000 acres in extent. Competition by open range livestock is a serious obstacle to success with turkeys and must be controlled. Plantings for turkeys must be fenced to exclude all forms of livestock or, better, confine the latter animals to fenced ranges.

Controlled use of fire aids in maintenance of proper food and cover conditions and in the control of parasites. Trees and shrubs producing food for turkeys should be spared in stand improvement operations. Openings for feed patches and to produce insect food are required. Freedom from disturbance is important and a degree of control of natural enemies is desirable.

Propagation: Bobwhite

Poyner, M. O. Modern methods of quail breeding, pp. 373-376.

To gain economy and efficiency, great changes have recently been made in quail rearing methods. The old and the new systems are contrasted under these headings: Methods of handling laying stock, brooding, and feeding. Small wire-bottom pens usable at all seasons have reduced the cost of quail production because of smaller amount of material, and reduced space and labor, required; and what is more important, have lowered mortality from disease. The Coleman brooder not proving very satisfactory in the North, the MacNamara colony house was developed; its construction and brooder elements are described. Use of the colony house reduces labor, equipment, and heating costs, and yields more uniformly developed birds. Feeding has been much simplified. Production has been increased.

Propagation: Game bird standards

Pirnie, Miles D. Game bird standards of perfection, pp. 378-380.

Notes variation due to age, sex, season, and subspecific status and consequent difficulty of setting standards. Suggests captive-rearing of sample flocks from wild eggs.

Propagation: Pheasant

Smith, E. C. Pennsylvania system of artificial brooding of ring-necked pheasants, pp. 376-378.

Adoption of an electric incubating and brooding system. Notes on the brooding equipment and its use; feeding; and cure of picking vices. Percentage of birds raised after consignment to brooders has improved and was 93.3 in 1935.

Propagation: Waterfowl

Grange, Wallace. Seminatural game farms for wild waterfowl, pp. 371-373.

The plan described, much like a well developed system of handling partridges and pheasants, gains its main advantage from the possibility of getting one or more clutches of eggs from the breeding stock besides the set they are allowed to incubate. It requires ample natural environment,

complete control of the land, adequate breeding stock, facilities for hatching surplus eggs and caring for the young, and for holding and properly attending to the birds the year round. By this system hardy stock trained to forage for itself can be produced. In Wisconsin great horned owls, crows, snapping turtles, and fox snakes are about the only enemies that must be combatted.

Weights of game

Gerstell, Richard. Pennsylvania's field game investigations, pp. 365-368.

Report on a program in existence about 6 months. Among interesting findings were that only about 2 percent of the ruffed grouse in Pennsylvania are of the gray phase; that the birds weighed from 0.79 to 1.76 pounds, average of 187, 1.35 pounds. Of 104 specimens accurately sexed, 62 were males and 42 were females. The weights of 47 quail were: Lightest 4.6 ounces, heaviest 6.4, average 6.05. Similar figures for 428 male pheasants are: Minimum 2.00 pounds, maximum 3.82, average 2.87.

Deer weights vary greatly, due apparently to the degree of overbrowsing chacterizing different sections of the State. The average weight of 41 bucks from a county where food conditions were good was 116 pounds (hog dressed), and of 25 from an overbrowsed area only 75 miles distant, 94 pounds.

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